

VIRTUAL TOUR

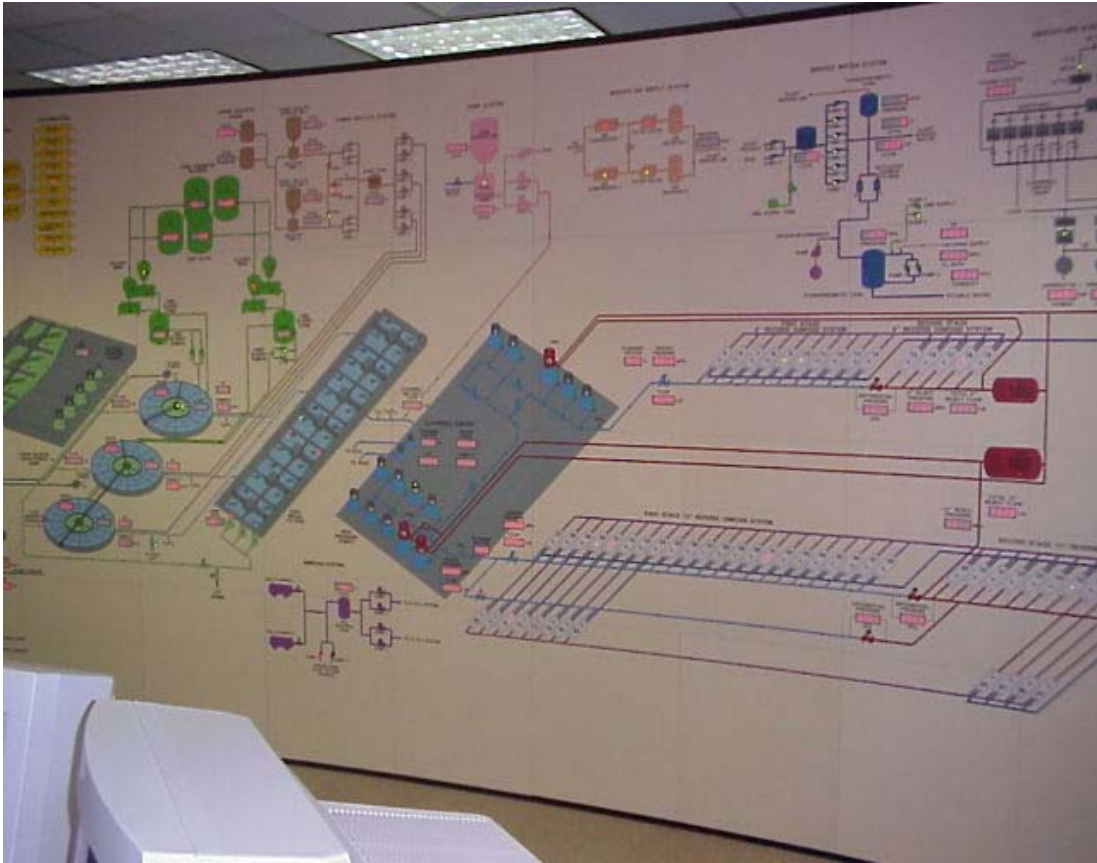
Water Quality Improvement Center



The Water Quality Improvement Center (WQIC) is the first National Center for Water Treatment Technology sponsored by the National Water Research Institute (NWRI). The WQIC is available to partners and the private industry on research projects. The center provides investigators with a pilot-scale research and development facility to use in testing equipment, instrumentation, or separations processes. The facility is also available to municipalities or consultants that need a place to run tests to gather design data for water treatment or other types of plants

VIRTUAL TOUR

Supervisory Control Data Board



A graphic display panel is used to simultaneously show all operations of the Yuma Desalting 72 million-gallon a day production plant. This mimic board has indicators that show pump operations, valve status and alarm conditions. Digital readouts or meters show levels and flow rates.

VIRTUAL TOUR

Typical Membrane Element



A typical spiral wound reverse osmosis membrane element being pulled from a vessel for autopsy. *Note:* The brown coating on the cross section of the membrane element represents membrane fouling.

VIRTUAL TOUR

Portable Cleaning Skid



VIRTUAL TOUR

Desalination Research



In 1998 Boyle Engineering Corporation and Olivenhain Water District performed Microfiltration (MF), Ultrafiltration (UF), and Nanofiltration (NF), pilot studies at the WQIC. The testing determined the best Integrated Membrane Systems (IMS) to meet the Olivenhain Water Storage, in San Diego, using the Colorado River.

VIRTUAL TOUR

Yuma Desalting Plant



Aerial view of the Yuma Desalting Plant looking West. The intake is at the upper right, with the SCRs the three large round tanks in the center of the photo.

VIRTUAL TOUR

Element Drying Apparatus



The Element Drying Apparatus was constructed to determine the optional drying conditions for long term storage of the Yuma Desalting Plant's cellulose-acetate elements in ambient conditions.

VIRTUAL TOUR

Membrane Autopsy II



An autopsy is being performed on a membrane element's effective area to determine the cause for change in performance. *Note:* The brown coating across the visible leaves of the unwound membrane is fouling.

Reverse Osmosis Membrane Element

Membrane Construction

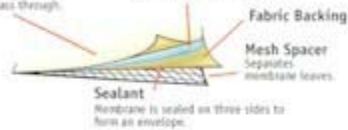
Salt-Rejecting Membrane Cast on Fabric Backing
Coats the fabric backing to allow water molecules to pass through.

Plasticized Tricot Spacer
Grows in the sheet under a spiral flow of desalted water to the exit tube in the center of the vessel.

Fabric Backing

Mesh Spacer
Separates membrane leaves.

Sealant
Membrane is sealed on three sides to form an envelope.



Spiral-wound Element

Water Flow
Water enters the membrane along the brine spacer. Pressure forces the small water molecules through the salt-rejecting fabric.

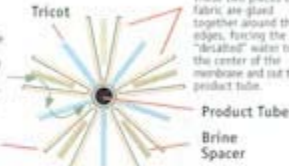
Tricot

Envelope Fabric

Membrane Leaf
These two pieces of fabric are glued together around the edges, forcing the "desalted" water to the center of the membrane and out the product tube.

Product Tube

Brine Spacer



Membrane Spiral

Once the fabric is sealed to create an envelope, all the pieces are wrapped in a spiral direction.



Element Construction

Salt Rejecting Membrane Surface

Membrane

Envelope (glued edges form an envelope)

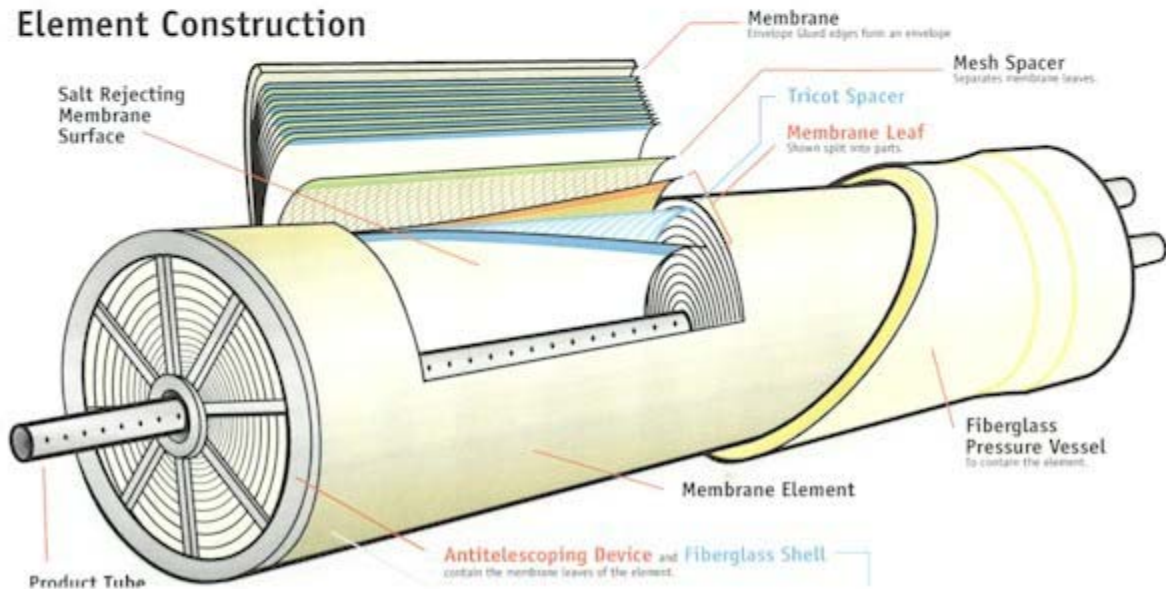
Mesh Spacer

Separates membrane leaves.

Tricot Spacer

Membrane Leaf

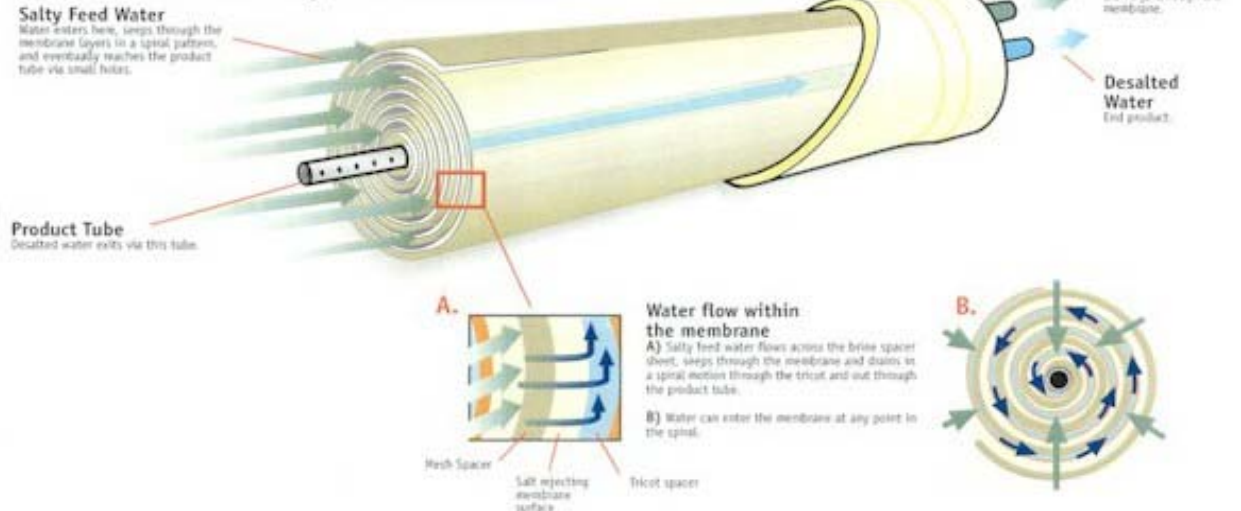
Shown split into parts.



VIRTUAL TOUR

Water Flow through out the Element

Water flow through the Element



U.S. Bureau of Reclamation
Water Quality Improvement Center

VIRTUAL TOUR

Pilot System No. 3 Gravity Filters



Pilot System 3 (PS3) dual media gravity filters in the WQIC provide depth filtration of clarifier effluent and consist of six individual filter columns that are 30 inches in diameter. When all six filters are in operation they produce a flow rate and when 3 filters are in operation they produce a flow rate of 30gpm.

VIRTUAL TOUR

Ro Demonstration Unit

Picture not available.

A prototype Automatic Plugging Factor Monitor (APFM) is an automated instrument to measure Silt Density Index (SDI). The SDI method provides data on the concentration and nature of particulate material in water. The test involves passing a water sample pore size. As the test proceeds of 30 psi through a membrane filter with 0.45-micron particles, causes the flow to decrease versus time. This relative flow decrease yields a percent plugging factor value. Dividing the plugging factor value by the filtration duration 15 minutes yields the SDI value.

VIRTUAL TOUR

Ro & Nano Filtration Skid



A fully instrumented Reverse Osmosis (RO) and Nano-Filtration (NF) skid allows customers to tailor research to their needs. The purpose of these skids is to evaluate the performance of spiral-wound RO and NF membrane elements.

VIRTUAL TOUR

Fluid Systems



The Fluid Systems (FS) unit is designed to operate up to 85 percent and consists of six pressure vessels with four membrane elements per vessel and a permeate capacity of 258 gpm. PS1 models the main plant for optimization studies, performance verification, personnel training, developmental testing of new systems and serve as the potable water source for the YDP facility.

VIRTUAL TOUR

Swatch Unit



A fully instrumented Swatch Unit used to accommodate various customers. The purpose of the swatch unit is to screen and evaluate the performance of flat sheet membranes under abnormal operating conditions. This research on membranes is performed on a bench scale and eliminates the need for "destructive testing" on full size membranes thus significantly reducing the cost of membrane research.

VIRTUAL TOUR

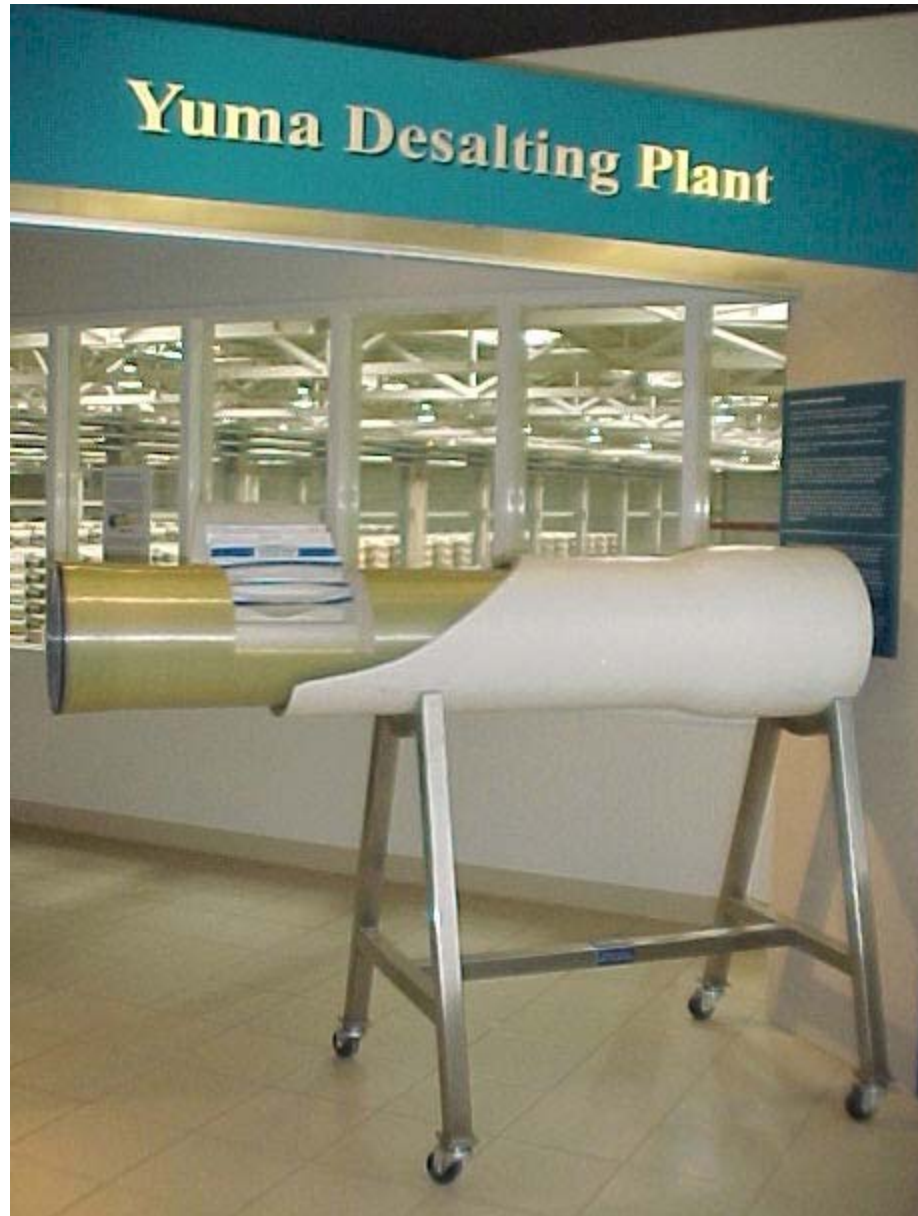
Automatic Plugging Factor Monitor



A prototype Automatic Plugging Factor Monitor (APFM) is an automated instrument to measure Silt Density Index (SDI). The SDI method provides data on the concentration and nature of particulate material in water. The test involves passing a water sample maintained at constant pressure of 30 psi through a membrane filter with 0.45-micron pore size. As the test proceeds the progressive blockage of the filters pores by particles, causes the flow to decrease versus time. This relative flow decrease yields a percent plugging factor value. Dividing the plugging factor value by the filtration duration 15 minutes yields the SDI value.

VIRTUAL TOUR

RO Membrane



As part of the Bureau of Reclamation K-20 program, a fluid systems Reverse Osmosis (RO) pressure vessel (white) and membrane element has been cut to show the cross-section of the vessel and various layers inside a membrane element. The pressure vessels is constructed of figerglass adn contains the membrane element. Teh membrane consist of a salt rejecting membrane, plasticized tricot, fabric backing, and mesh spacer. The salt-rejection membrane allow the permeate water to flow in a spiral towards the product tube in the center of the membrane element. The fabric backing provides support for the membrane to prevent collapsing when pressure is applied. The mesh spacer separates the membrane to form an envelope.

VIRTUAL TOUR

Supervisory Control



A PC based Supervisory Control and Data Acquisition (SCADA) system is used to control and monitor water research projects. The water Quality Improvement Center (WQIC) facility is equipped with local area network computers. This allows partnership researchers to locally view real time data, trends, operating conditions, and manage their research projects from their office or WQIC water lab. Researchers must have a password to access their project information.

VIRTUAL TOUR

WQIC Lab Facilities



WQIC customers have access to a designated research lab to compile and analyze data while performing their tests.